

Prevalence of, Risk Factors for, and Consequences of Posttraumatic Stress Disorder and Other Mental Health Problems in Military Populations Deployed to Iraq and Afghanistan

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Published online: 16 April 2015
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Abstract This review summarizes the epidemiology of post-traumatic stress disorder (PTSD) and related mental health problems among persons who served in the armed forces during the Iraq and Afghanistan conflicts, as reflected in the literature published between 2009 and 2014. One-hundred and sixteen research studies are reviewed, most of which are among non-treatment-seeking US service members or treatment-seeking US veterans. Evidence is provided for demographic, military, and deployment-related risk factors for PTSD, though most derive from cross-sectional studies and few control for combat exposure, which is a primary risk factor for mental health problems in this cohort. Evidence is also provided linking PTSD with outcomes in the following domains: physical health, suicide, housing and homelessness, employment and economic well-being, social well-being, and aggression, violence, and criminality. Also included is evidence about the prevalence of mental health service use in this cohort. In many instances, the current suite of studies replicates findings observed in civilian samples, but new findings emerge of relevance to both military and civilian populations, such as the link between PTSD and suicide. Future research should make effort to control for combat exposure and use longitudinal study designs; promising areas for investigation are in non-treatment-seeking samples of US veterans and the

role of social support in preventing or mitigating mental health problems in this group.

Keywords Deployment · PTSD · Military · Epidemiology · Depression · Substance misuse · Health service utilization

Introduction

Research on trauma and related mental health problems has historic roots in the effect of combat exposure among military personnel [1]. This research grew significantly after the Vietnam War, prompted in large part by the inclusion of posttraumatic stress disorder (PTSD) in the Diagnostic and Statistical Manual of Diseases (DSM) in 1980. Since September 11, 2001, the USA has deployed more than 2.7 million men and women to support combat operations in Iraq and Afghanistan, and many other countries have deployed their military personnel in support as well. Over the course of the same time period, a number of research studies have been conducted examining various aspects of trauma and related mental and behavioral health problems among those who served in these current conflicts.

Between 2008 and 2011, our research team produced three reviews focused primarily on reconciling differences in published prevalence estimates of PTSD among military personnel serving in these conflicts [2–4]. Other review articles have been published with similar aims [5–7] as well as those that have compared PTSD in the current conflict with other war eras [8, 9]. There have also been reviews that have focused on the specific experiences of female service members and veterans from the current conflicts [10–13] as well as reviews that have focused on mental health and associated cognitive outcomes independent of or that co-occur with PTSD, like

This article is part of the Topical Collection on *Disaster Psychiatry: Trauma, PTSD, and Related Disorders*

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substance use [14] and traumatic brain injury [15, 16]. Attention has also been paid to screening programs for persons with possible mental health problems, as noted by one review [17]; two other reviews examined health service utilization among service members and veterans with PTSD [18, 19]. Finally, there have also been reviews that are not systematic but that nonetheless present an overview of research on the epidemiology of trauma and mental health problems of those US service members deployed in support of the recent conflicts in Iraq and Afghanistan, and the implications these studies have on future research and public policy [20, 21].

In this review, we aim not to duplicate what has been done before, but rather to summarize the epidemiology of PTSD and related mental health problems among persons who served in the armed forces during the Iraq and Afghanistan conflicts, as reflected in the literature published between when we completely published our last review in 2009 [4] and 2014.

Methods

Search Strategy

Replicating our prior search strategy occurring in April 2009 [4], we searched the Published International Literature on Traumatic Stress (PILOTS) database between April 1, 2009 and September 14, 2014 for potentially relevant articles related to the epidemiology of PTSD among those serving in military operations in Iraq and Afghanistan during the twenty-first century. Research indexed in PILOTS is more expansive than publications in academic journals and contains research on PTSD and other mental health consequences of traumatic events. Search terms included “PTSD” AND (“Iraq War” OR “Afghanistan” OR “OEF” OR “Operation Enduring Freedom”) AND (“epidemiology” OR “health care utilization”).

Study Selection

We were interested in primary data collected specifically to investigate the prevalence of, risk factors for, and consequences of PTSD and other mental health problems among service members or veterans from any country who served in Iraq and Afghanistan after September 11, 2001. As such, studies seeking to validate diagnostic measures or evaluate programs rather than naturalistically study the phenomena of interest were excluded. In addition, articles reporting simulated data (i.e., data-generated computation that is not real but intended to imitate collected empirical data) were excluded. Articles were also excluded if they were commentaries, reviews, theses, or dissertations or were published in a language other than English. Two reviewers independently screened all titles and abstracts for inclusion. Each article deemed relevant

by both reviewers had its full text retrieved. Any article in which the reviewers disagreed was assessed by a third reviewer for final decision about whether to be included or excluded. Full-text articles were again assessed for eligibility by two reviewers, and disagreements resolved by a third reviewer. Our initial search produced 353 studies; after applying the exclusion criteria, 116 were ultimately included in our review.

Data Abstraction

A structured data abstraction form was used to collect information on the following variables for every study: study method and sample size, time frame of data collection, and participant demographics (country, active duty status, military branch, and operation served). As relevant per study, data was abstracted on prevalence of PTSD, correlates or predictors of PTSD, prevalence and type of trauma exposure, prevalence and type of other mental or behavioral health problems, prevalence of mental health-care utilization, and correlates or predictors of mental health-care utilization.

Data Synthesis

Upon completing a title review of all included studies, and based on the study objective, we highlighted four areas related to epidemiology of trauma and related to PTSD: study features (samples and methods), prevalence of PTSD, risk factors for PTSD, and consequences of PTSD. Because many articles in our search also include depression or substance misuse, which can include hazardous drug or alcohol use, drug or alcohol abuse, and/or drug or alcohol dependence, we documented prevalence and risk factors for these conditions as well, though did not investigate consequences associated these conditions. Mental health treatment is one additional consequence of PTSD that we consider separately.

Results

Study Features

Study Samples Studies were categorized according to whether they (1) represent a US or non-US population, (2) focus on current service members (either members of the Active or Reserve Components) or veterans (individuals no longer serving in the Active or Reserve Components), and (3) were seeking treatment or non-treatment seeking. As shown in Table 1, among the US studies, the most voluminous categories are non-treatment-seeking samples of service members (36 studies) and treatment-seeking samples of veterans, most of whom are seeking VA care (41 studies). There are fewer studies that examine treatment-seeking service members, most of which are active-duty personnel (12 studies) or veterans that are not

Table 1 Study sample characteristics

	US populations		Non-US populations	
	Service members	Veterans	Service members	Veterans
Non-treatment-seeking studies	36 studies [22–39, 40•, 41–44, 45•, 46–57] ^a	15 studies [58, 59•, 60–72]	UK (8 studies) [45•, 73–77, 78•, 79] ^a Denmark (1 study) [80] Netherlands (1 study) [81]	Portugal (1 study) [82] UK (2 studies) [79, 83]
Treatment-seeking studies	12 studies [84–95]	41 studies [96–99, 100•, 101•, 102–104, 105•, 106–136]	–	UK (1 study) [137]

^a The study of Sundin et al. [45•] presents data on both US and UK service members, and that of Goodwin et al. [79] is a longitudinal study of service members, some of whom become veterans during the course of the study

accessing care (15 studies). Most non-US studies are among UK service members not-seeking treatment (eight studies), though there are also studies of Dutch and Danish service members and Portuguese veterans.

Study Methods Studies were categorized according to whether they were analyses of administrative data (mostly administrative medical records including indicators of diagnoses), or surveys, of which studies were either cross sectional or longitudinal (or *quasi-longitudinal*; for example, a unit surveyed at two time periods, but whose members may have changed). Forty studies used administrative data; of the remaining, 59 were based on cross-sectional surveys, 2 used a combination of administrative data and cross-sectional surveys, and 15 were based on longitudinal or quasi-longitudinal surveys.

Prevalence of PTSD, Depression, and Substance Misuse

Among the non-treatment-seeking samples, PTSD prevalence estimates ranged from 0 % in a sample of 49 Dutch Physicians who had been deployed to Afghanistan [81] to 48 % in a convenience sample of 97 US National Guard troops recruited at weekend drills post-deployment [35]. For depression, prevalence estimates ranged from 4 % in a sample of UK service members who had been deployed to Iraq [73] to 45 % of navy sailors and marines screening positive on the Post-Deployment Health Reassessment (PDHRA) [43]. Substance misuse ranged from 4 % of veterans screening positive for an alcohol use disorder [30] to 66 % of a convenience sample of 50 female veterans indicating an alcohol problem in an online survey [60].

Among the treatment-seeking samples, PTSD estimates ranged from 2 % of female service members who had completed at least one deployment in support of Operation Iraqi Freedom (OIF), Operation Enduring Freedom (OEF), or Operation New Dawn (OND) who had a diagnosis of PTSD by a military medical provider [95] to 68 % in a sample of 200 OEF/OIF veterans evaluated for traumatic brain injury (TBI) at a polytrauma outpatient clinic [109]; depression estimates ranged from 1 % of male veteran users of Veterans Health Administration (VHA) services within a year of their last deployment [103] to 60 % of veterans referred to the New Jersey

War Related Illness and Injury Study Center (WRIISC) [104]; and substance misuse ranged from 3 % of OIF/OEF veterans receiving a drug dependence diagnosis by the VHA [97] to 60 % of veterans referred to the New Jersey WRIISC screening positive for alcohol misuse [104].

Past reviews offer explanations for the wide range of prevalence estimates [4–7]. With respect to samples, the treatment-seeking samples have higher rates of mental health problems than the general population samples. The methods and criteria used to identify cases of PTSD, depression, or substance misuse can also lead to variability in prevalence estimates, even within the same sample. Finally, differences in samples' exposure to combat, which can vary not only by military occupation but also by the time and place of deployment, may also create wide ranges.

Risk Factors for PTSD, Depression, and Substance Misuse

Even though there are relatively few longitudinal studies, we categorize correlates *theoretically* into those that are potential risk factors. Combat exposure is the strongest predictor of mental health problems among military personnel deployed to Iraq and Afghanistan [4, 6], a finding replicated in the current suite of studies with relationships between combat exposure and PTSD [24, 33, 38, 39, 40•, 41–44, 45•, 56, 72, 98], depression [33, 40•, 56, 72], and substance misuse [45•]. Because such exposure is not necessarily random among deployed personnel, for other potential risk factors, we highlight the number of studies that do and do not control for combat exposure in three areas: demographics, military characteristics, and factors associated with deployments.

Demographics As shown in Table 2, there are consistent findings that females are at increased risk for depression, males are at increased risk for substance misuse, and individuals with lower levels of education are at increased risk of PTSD. In other areas, findings are more nuanced. For example, younger age groups are generally at increased risk for PTSD, but one study found that females over 30 seen at the VA were more likely to have a PTSD diagnosis [113]. Similarly, unmarried or separated persons are generally at higher risk for PTSD,

Table 2 Potential demographic risk factors of PTSD, depression, and substance misuse

Correlate	Study characteristics	Key findings
Gender	Total studies=13 • 4 longitudinal • 2 controlled for CE	Females at increased risk for depression [27, 34, 40•, 71, 102, 111–113, 117]. Males at increased risk for substance misuse [71, 73, 111–113, 117]. Findings on PTSD are mixed, with some studies showing males at higher risk [56, 73, 102, 112, 113, 138] and others showing females at higher risk [34, 38, 40•].
Age	Total studies=8 • 1 longitudinal • 1 controlled for CE	For males, risk is greater for those under 40 for PTSD [113, 117] and under 30 for alcohol misuse [117, 135]. For female veterans, being over 30 increases risk for PTSD [111, 113] and depression [113], though diagnoses for PTSD by a military health-care provider is higher among females under 25 [95]. Age was inversely related to new-onset symptoms or diagnosis of PTSD [61, 115, 138].
Race	Total studies=3 • 1 longitudinal • 1 controlled for CE	Black/African-American marines had lower risk for PTSD [88], and white veterans had increased risk for depression [111]. White non-Hispanics had lower risk of new-onset symptoms or diagnosis of PTSD [38].
Education	Total studies=3 • 1 longitudinal • 2 controlled for CE	Those with lower levels of educational attainment had increased risk for PTSD [24, 73]. Those with a bachelor's degree were more likely to have new-onset symptoms or diagnosis of PTSD than those with high school or less [38].
Marital status	Total studies=6 • 1 longitudinal • 2 controlled for CE	Not being in a relationship (single, divorced, separated, or widowed) increases risk for PTSD [24, 61, 113], depression [113], and substance misuse [73]. Relationship satisfaction is inversely associated with PTSD symptoms [35]. However, among marines, those married were at increased risk for depression and PTSD [88].

CE combat exposure

though one study of marines found that a risk of a PTSD diagnosis was elevated among those who were married [88]. Finally, there is conflicting evidence about whether PTSD is more common in men or women, though the only study to control for exposure to combat found an elevated risk of PTSD in females [40•].

Military Characteristics Aside from a single study that found higher rates of PTSD, depression, and substance misuse among members of the National Guard [47], no study that found differences by other military characteristics like service branch, rank, or military occupation adjusted for combat exposure. Thus, higher prevalence rates among members of the army and marine corps, enlisted personnel and those of lower rank, and certain military occupational groups reported in Table 3 may be explained by differences in combat exposure.

Deployment Characteristics As presented in Table 4, there is consistent evidence that PTSD symptoms increase as the time since returning from deployment increases and that PTSD is also associated with being injured in theater. There is also evidence that PTSD risk increases with two or more deployments [73, 113, 117], though one study finds the inverse [33]. An emerging literature, influenced largely by the Deployment Risk and Resilience Inventory [139], also finds that pre-deployment factors like prior stressors and childhood adversity, deployment-related conditions like perceptions of being prepared for deployment, leadership during deployment, concerns about family during deployment, and social support both during and after deployment are all related to mental

health problems. Compared to the demographic and military correlates presented above, these results may be more robust, as many control for combat exposure and/or derive from longitudinal samples.

Consequences of PTSD

Similar to our categorizing risk factors as such, we categorize correlates theoretically into those that are potential consequences of PTSD, whether or not they derive from longitudinal samples. Table 5 highlights the evidence of relationships between PTSD and outcomes in six domains: physical health, suicidality, homelessness, unemployment and economic well-being, social well-being, and aggression, violence, and criminality.

These studies show that individuals who served in Iraq and Afghanistan with PTSD diagnoses or who endorse symptoms consistent with such diagnoses have worse physical health outcomes, report higher levels of suicide ideation and are more at risk of dying by suicide, and suffer both economically and socially. In addition, studies have also found relationships between PTSD, substance misuse, and aggression and criminal outcomes.

Mental Health Treatment Utilization

Studies found that less than half of military personnel and veterans who indicate need for mental health services actually receive such care [29, 60, 72, 135], though mental health-care utilization was notably high at 83 % in one study on warfighters who sustained a combat injury leading to major extremity

Table 3 Potential military risk factors of PTSD, depression, and substance misuse

Correlate	Study characteristics	Key findings
Service branch	Total studies=7 • 1 longitudinal • 1 controlled for CE	In the USA, PTSD is more prevalent in the army [38, 95, 98, 100•, 113, 117] and in the marine corps [95, 98, 100•]; depression is more prevalent in the army [113]. In the UK, PTSD and substance misuse are more prevalent in the army [73].
Rank	Total studies=8 • 2 longitudinal • 1 controlled for CE	PTSD is more prevalent among enlisted personnel relative to officers [31, 79, 113, 117] and is inversely related to higher rank [38, 88, 100•]. Depression is more prevalent among enlisted [113] and among those of lower rank [88]. In the UK, substance misuse is more common among those of lower rank [73].
Military occupation	Total studies=5 • 1 longitudinal • 0 controlled for CE	PTSD is more common among health-care occupations [88, 95], combat specialists [88], and service and supply personnel [88]. Among the occupations, there is modification by officer/specialist status [31]. In the navy, depression is more common among health-care or combat specialists [88] and, in the marines, among combat specialists [88]. In the UK, substance misuse [73] and delayed-onset PTSD [79] is more common among combat or combat-support personnel.
Component/veteran status	Total studies=5 • 2 longitudinal • 1 quasi-longitudinal • 2 controlled for CE	PTSD and depression are more common among those who participated in active-duty service [61, 111]. PTSD, depression, and alcohol misuse are more common among National Guard and increase over time more significantly for members of NG [38, 47]. In the UK, leaving the military was associated with delayed-onset PTSD, an effect that was attenuated after adjustment [79].

amputation [90]. Some studies found that those with PTSD or greater PTSD symptoms exhibited more treatment-seeking behaviors than those with other mental health disorders or less severe symptoms [22, 64, 71, 100•, 116], though one study found no relation between PTSD and use of morphine or benzodiazepines in a sample of military personnel injured during combat [86]. Prominent barriers to care include difficulty scheduling an appointment or getting time off, stigma, and treatment costs [28, 57, 71, 72]. For those who did utilize treatment, several studies indicated the use of non-traditional mental health service providers, such as chaplains [22, 25].

Discussion

The goal of this review was to identify key findings from the epidemiologic literature published between 2009 and 2014 concerning PTSD and related mental and behavioral health conditions among those who served in the armed forces during the Iraq and Afghanistan war eras. In many instances, the findings replicate what is seen in civilian studies: for example, that depression is more common among females [140] and substance misuse is more common among males [141]. However, in other areas, new findings are noteworthy. There are significant associations between factors like deployment conditions and social support experienced during and after deployments observed in statistical models that simultaneously account for combat exposure, indicating that these are likely salient factors that could help identify, prevent, or mitigate the risk of PTSD in future conflicts. Unfortunately, findings regarding military characteristics associated with mental health problems suffer from not having controlled for critical factors known to increase risk like combat exposure. With respect to

consequences of PTSD, while correlations between mental and physical health conditions are consistent with what is seen among civilians [142], the current suite of studies highlights new and important findings that will contribute not just to our knowledge about the consequences of PTSD among veterans, but among civilians with PTSD symptoms as well, such as the risk of suicide among individuals with a PTSD diagnosis [105•].

The review leads us to four key recommendations for both policy and future research.

1. *Studies are needed of non-treatment-seeking veterans.* Most studies are conducted among general populations of service members or among treatment-seeking veterans. Both samples are clinically and epidemiologically useful. However, as the veteran population of those who deployed to Iraq and Afghanistan grows, there is a need for population-based studies of veterans. In the USA, less than half of those who served in support of OIF/OEF/OND accessed medical care in the VA at least once [57]. Though it is likely that this group has less mental and behavioral health problems than veterans receiving regular mental health care, the research reviewed here indicates that fewer than half of veterans with mental and behavioral health problems do not access any care for such conditions. Research on veterans not in treatment can help identify strategies to encourage those in need to access care and can help quantify the burden that untreated mental and behavioral health problems have on society.
2. *Studies that identify potential risk factors for PTSD and related mental and behavioral health problems should adjust for combat exposure.* Combat exposure is the strongest predictor of mental and behavioral health problems in this cohort. By controlling for combat exposure, research is

Table 4 Potential deployment-related risk factors of PTSD, depression, and substance misuse

Correlate	Study characteristics	Key findings
Number of deployments	Total studies=6 • 2 longitudinal • 2 controlled for CE	PTSD prevalence increases as the number of deployments increase [95]; more than 2 deployments increase risk of PTSD [113, 117] though, in the UK, only among reservists [73]. However, there are also findings that the number of deployments is inversely associated with depression [40•]; 2 or more deployments was associated with a reduced risk of “PTSD or depression” [33].
Time since deploying	Total studies=3 • 3 longitudinal (1 quasi-longitudinal) • 3 controlled for CE	Symptoms of PTSD and depression increase as the time since returning from deployment increases [43, 47], though in one study, PTSD symptoms decreased over time [56].
Injured	Total studies=2 • 0 longitudinal • 0 controlled for CE	Being injured during combat increases risk of PTSD [88, 98] and depression [88].
Pre-military or pre-deployment factors	Total studies=7 • 3 longitudinal • 3 controlled for CE	PTSD is predicted by prior stressors [27], childhood adversity/vulnerability [27, 73], poorer perceptions of preparedness [27, 44, 78•], and pre-deployment symptoms [40•, 95]. Depression is predicted by prior stressors [27], childhood adversity/vulnerability [27], poorer perceptions of preparedness [27, 44, 78•] or reporting having not received a pre-deployment stress briefing [78•], and pre-deployment symptoms [40•, 79]. Among UK soldiers, alcohol misuse is predicted by childhood adversity/vulnerability [73].
Deployment conditions	Total studies=8 • 4 longitudinal (1 quasi-longitudinal) • 3 controlled for CE	PTSD is predicted by non-combat-related deployment stressors [24], poor perceived unit social support and unit leadership [78•], concerns about family [27, 42, 44], and austere, exposed, or dangerous location during deployment [74, 79]. Depression is predicted by poor perceived unit social support [27], concerns about deployment disrupting life and family [27], and daily hassles when deployed [56].
Post-deployment factors	Total studies=3 • 3 longitudinal • 2 controlled for CE	PTSD is predicted by poor post-deployment social support [41, 44] and post-deployment life stressors [41]. In the UK, delayed-onset PTSD is predicted by immediate post-deployment sub-threshold PTSD, mental health status, multiple physical symptoms, worsening of these conditions, and development of alcohol misuse [79].

better poised to understand the etiology between risk factors like gender, educational attainment, and marital status on the development of PTSD and to ultimately craft strategies and policies that aim to prevent or recognize mental and behavioral health problems in groups at higher risk, conditional on exposure to combat. This will likely be problematic for research using the rich administrative medical data collected by the Department of Veterans Affairs that has no indicator of combat exposure, yet which comprises nearly one-half of the studies in the current review.

3. *Studies should investigate the importance of social support both during and after deployment and its relationship to mental and behavioral health problems.* The current review highlights that both during and after deployment, the support of ones' peers is influential in the development of PTSD. While not necessarily a new finding with respect to PTSD generally [143, 144], replicating the finding in the current cohort of service members and veterans is important. More research is needed to identify the role

social support plays specifically in this context and what policy changes or leadership tactics may promote unit cohesion and thus possibly mitigate the risk of mental health problems after combat trauma.

4. *Longitudinal research is needed to discern temporality between risk factors for and consequences of mental and behavioral health problems.* Studies that examine deployment-related factors on post-deployment health or of post-deployment health on potential consequences are largely cross sectional. While useful for uncovering statistical associations, they suffer from bias that persons with mental or behavioral health problems may reflect upon the past differently from those who do not have symptomatology. In other words, the symptoms may cause a service member or veteran to incorrectly recall that he or she did not receive a pre-deployment training or perceive poor leadership during deployment. Combining administrative data with survey data can mitigate some of this bias, but longitudinal studies of service

Table 5 Potential consequences associated with PTSD

Topic	Study characteristics	Selected findings
Physical health	Total studies=19 • 14 record review • 4 cross sectional • 1 longitudinal	PTSD is associated with worse disability and general health [26, 38, 61, 82, 91, 96, 101•, 116] and specific conditions including sleep problems [89, 109, 132], GI disorders [112], headaches [46, 118], pain [93, 104, 132], and cardiovascular outcomes [115, 120]
Suicide and suicidality	Total studies=7 • 2 record review • 5 cross sectional • 0 longitudinal	PTSD associated with self-reported suicidality [30, 62, 106, 108, 121, 136] and death by suicide [105•]
Housing and homelessness	Total studies=2 • 1 record review • 0 cross sectional • 1 longitudinal	Homeless veterans are more likely to have had lower-pay grades and behavioral health diagnoses like PTSD prior to separating from service [69]. Treatment-seeking homeless female veterans had higher rates of anxiety disorder, bipolar disorder, or major depression and lower rates of alcohol use disorder, substance use disorder, or PTSD than males [133]
Employment and economic well-being	Total studies=4 • 0 record review • 4 cross sectional • 0 longitudinal	Screening positive for depression, PTSD, or TBI is associated with financial mismanagement [67]. Veterans with diagnosed mental health disorders are more likely to be part-time employed, unemployed, disabled, or retired than full-time employed [54, 131]. PTSD symptomatology among veterans is associated with job dissatisfaction and problems with handling money/bills [61]
Social functioning	Total studies=4 • 1 record review • 3 cross sectional • 0 longitudinal Note: Lew et al. [134] use both survey and administrative data	High rates of post-deployment veterans report driving difficulty compared with pre-deployment, with the highest rates among those diagnosed with PTSD [130, 134]. Low-levels of post-deployment support correlates with higher likelihood of probable PTSD [83]. PTSD symptomatology among veterans is associated with greater difficulties with family and relationships [61]
Aggression, violence, and criminality	Total studies=6 • 1 record review • 6 cross sectional • 1 longitudinal Note: Tsai et al. [70] use both survey and administrative data	Post-deployment violence was significantly associated with PTSD and alcohol misuse [47, 55, 68, 77]. Self-report of aggressive impulses predicted future physical aggression in veterans [58]. Incarcerated veterans of OEF/OIF/OND diagnosed with PTSD at higher rates than other incarcerated veterans [70]

members before, during, and after deployments are the most useful study designs for avoiding such biases.

The epidemiologic literature on PTSD, depression, and substance misuse among those who served in Iraq and Afghanistan is vast. The search terms we used were based on prior reviews we had conducted, though acknowledge that there may be relevant literature uncovered in our search strategy. Nonetheless, we were able to review over 300 articles published in the last 6 years and identify key findings and themes emerging from this literature.

Conclusion

Understanding the risk for and consequences of deployment-related mental health problems among combat veterans is critically important for informing better prevention and treatment. Our review

underscores the need for additional research on factors that increase risk conditional on well-established risk factors like combat exposure, among veterans currently not accessing care, on the role of social support in preventing mental health problems, and longitudinal research to discern temporality between constructs. Such research will help policy makers and clinicians better care for service members and veterans with mental health problems.

Compliance with Ethics Guidelines

Conflict of Interest Support for this manuscript was provided by a Congressionally-Directed Medical Research Program (PI: Jaycox). All other authors do not have conflicts.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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